Dean, E.A. 2014. Two new species of *Lycianthes* series *Tricolores* from eastern Mexico. Phytoneuron 2014-42: 1–6.
Published 2 April 2014. ISSN 2153 733X

TWO NEW SPECIES OF *LYCIANTHES* SERIES *TRICOLORES* FROM EASTERN MEXICO

ELLEN A. DEAN
UC Davis Center for Plant Diversity
Plant Sciences M.S. 7
One Shields Avenue
Davis, California 95616
eadean@ucdavis.edu

ABSTRACT

Two new species, **Lycianthes venturana** E. Dean, **sp. nov.** and **Lycianthes michaelneei** E. Dean, **sp. nov.**, are described from eastern Mexico, the former from the state of Puebla and the latter from the state of Veracruz. Both species belong to series *Tricolores* Bitter, which is made up of six species of shrubs with simple trichomes and that are distributed from Nicaragua to western Mexico.

Lycianthes (Dun.) Hassler (Solanaceae) has both Old World and New World representatives and includes 150 to 200 species (Hunziker 2001). Its center of distribution, and the majority of its taxa, are found in the New World (from Mexico to Argentina), with ca. 30 taxa native to Mexico (ca. 14 endemic, two of them described here). The genus is the closest relative of the chile pepper genus *Capsicum* L. (Walsh & Hoot 2001; Bohs & Olmstead 1997), a relationship that was first pointed out by the German botanist Georg Bitter (Bitter 1919). The two genera have a similar calyx morphology, with the five lobes of the calyx truncated into a sleeve, below which may protrude five to ten appendages (commonly called calyx teeth). However, while *Capsicum* species have anthers that dehisce by longitudinal slits, the species of *Lycianthes* typically have poricidal anther dehiscence.

The entire genus was last monographed in 1919 by Bitter, who divided the species into sections and series but provided no identification key (Bitter 1919). In that work, he placed just two species, *Lycianthes tricolor* (Dun.) Bitter and *L. arrazolensis* (J.M. Coult. & Donn. Sm.) Bitter, in series *Tricolores* Bitter, a group of Mexican and Central American shrubs with simple trichomes and green, glandular markings on the corolla near the filament insertion point. During a study of herbarium specimens in preparation for a taxonomic treatment of series *Tricolores*, two things became clear.

First, not all members of the series have the distinctive green glands on the corolla.
Second, two Mexican taxa need to be described and published. An identification key to all six species will be included in the full treatment.

Terminology here follows that of previous papers on this genus (Dean 1998, 2007). Corolla, calyx, and pedicel measurements were made on mature flowers that appear to have opened for at least one day. Based on how the flowers look on the herbarium specimens, I am assuming that these two species are similar to other species in the series in having corollas that open and close each day for several days in a row.

LYCIANTHES VENTURANA E. Dean, **sp. nov. TYPE: MEXICO. Puebla.** Mpio. Teziutlán: Agua de Obispo, bosque de encino en cañada, 1350 m, 25 Nov 1976, *F. Ventura A. 13635* (holotype: MEXU). Figure 1.

Belonging to series *Tricolores* and differing from the other species of the series in having an apiculate tip to the berry that forms where the style abscises from the developing fruit. Most similar

INSTITUTO DE BIOLOGIA
C.S.L.
HERBARIO NACIONAL
MEXICO
UNIBIO
918864
The UC Davis Center for Plant Diversity
HOLOTYPE
Lycianthes venturana E. Dean
Phtyoneuron 2014
Det. Ellen Dean Date: 2014
HERBARIO NACIONAL DE MEXICO (MEXU)
INSTITUTO DE BIOLOGÍA, UNAM
Lycianthes tricolor (Sessé & Moc. ex Dunal) Bitter
Det. Aaron Rodriguez, 2001
HERBARIO DE LA ESCUELA NACIONAL DE CIENCIAS BIOLOGICAS
INSTITUTO POLITECNICO NACIONAL — MEXICO, D. F
PLANTAS MEXICANAS
Lycianthes cf. tricolor (Sessé & Moc. ex Dun.) Bitter
Fam. Solanaceae N. v.
Loc. Agua de Obispo, municipio Teziutlán
Estado PUEBLA Fecha 25/XI/1976
Hab. bosque de encino en cañada
Alt. 1350 m.
Col. F. Ventura A. No. 13635
Observ. arbusto erecto de 1.50 m de altura; flor blanca, centro amarillo; escaso
Det. A.R.López F.,1983
0 1 2 3 4 5 6 7 8 9 10 cm
copyright reserved
Yellow Red Magenta White 3/Color Black
Blue Cyan Green

Figure 1. Holotype of *Lycianthes venturana*.

to *Lycianthes jalicensis* in having nearly glabrous calyces and flowers; differing from that species in geographic distribution, calyx length usually less than or equal to 2 mm (usually 2.5–4 mm in *L. jalicensis*), curved style (usually straight in *L. jalicensis*), anther pores on shorter stamens dehiscing upwards or toward style (versus away from the style in *L. jalicensis*), and apiculate fruit (non-apiculate in *L. jalicensis*).

Shrub, 1–1.8 m high. **Indument** of tan, appressed-antrorse to slightly spreading one- to several-celled non-glandular trichomes. **Stems** olive-green to light brown when young, darker brown and woody with age, upper branching mostly unichasial with a few dichasial branching points, the longest sympodia 4.5–8.7 cm long, 1.25–3 mm diam., glabrous to pubescent with appressed trichomes to 1 mm long. **Leaves of upper sympodia** mostly geminate, sometimes unifoliate; largest leaves with petiole 4–15 mm long, the lamina ovate, elliptic, or obovate, 8.7–13.3 cm long, 3.7–6.5 cm wide, the tip acuminate, the base cuneate to attenuate, sometimes oblique, the margin entire to undulate, the lamina glabrous to puberulent with appressed trichomes to 1.25 mm long, densest along the veins; smaller geminate leaves similar but with petiole 2–5 mm long, the lamina ovate to elliptic, 4–8.5 cm long, 1.9–4.9 cm wide, the tip acuminate, the base cuneate. **Flowers** in groups of 1–6(–10) in the leaf axils with one or two flowers per group open at the same time, the pedicels at maturity erect, curved at the tip, (1.3–)1.4–2.8 cm long, nearly glabrous, the trichomes appressed-antrorse, 0.25–0.75 mm long; calyx urceolate to campanulate, 1.5–2(–2.5) mm long, 1.75–2.5 mm diam., nearly glabrous, the scarce trichomes 0.15–0.75 mm long, the calyx margin entire, the 10 appendages 1–3.5 mm long, 0.25–0.75 mm diam.; corolla campanulate, sometimes becoming rotate due to tearing, (5–)9–14 mm long, white, most likely greenish on abaxial side near main veins, nearly glabrous, tiny hairs < 0.1 mm long located on abaxial side near main veins; stamens with straight filaments of unequal length, the four shorter filaments 1.25–1.5 mm long, the fifth 4–5 mm long, glabrous; anthers lanceolate, 3.5–4 mm long, the pores dehiscing toward the style; ovary ovoid to conical, glabrous, 1–1.5 mm long, the style 7–9 mm long, curved upwards at the tip, the stigma oblong-capitate, slightly bilobed. **Fruit** ovoid, apiculate, ca. 6 mm long, 4 mm diam. (perhaps immature in specimens cited here), mature color unknown, lacking sclerotic granules, the calyx in fruit often widening, becoming bowl-shaped, ca. 2 mm long, 4 mm wide, the pedicel in fruit 1.8–2.2 cm long. **Mature seeds** not seen.

Distribution and habitat. Mexico. Puebla. Elevation: 1250-1450 m. Vegetation types: oak forest, altered mesophytic forest. Habitats: shady canyons and mountainsides. Phenology: flowering May through November; mature fruits by November, probably before.

Additional specimens examined. **MEXICO. Puebla**. Mpio. Ahuacatlan, 4.5 km al SE de Ahuacatlan, brecha a Zapotitlan,1250 m, 24 May 1986, *Tenorio 11426* con Romero (MEXU); Mpio. Teziutlán, Puente Colorado, carretera Teziutlán - Tlapacoyan, 1450 m, 24 Jun 1970, *Ventura 1350* (MEXU, MO); Mpio. Hueytamalco, Rancho El Milagro, 1350 m, 27 May 1986, *Ventura 21982* (MEXU).

Lycianthes venturana is described here based on limited material from which mature fruit size and color, seed type, and corolla color and shape cannot be exactly known. Based on the available pressed material, the corolla is white and campanulate and probably has greenish coloration along the veins on the abaxial side. Whether or not the corolla has the small greenish glands present in some members of series *Tricolores* is not known, because they do not persist well on pressed material. The corolla shape appears to be campanulate, but with expansion, the corolla may tear to allow it to open into a more rotate orientation. The fruits of the type specimen are dark in color, apiculate, 6 mm long and 4 mm wide. Whether these fruits are mature is not known. Because of the limited material available, I did not dissect these fruits to examine the seeds. The apiculate tip to the fruits forms from the remains of the base of the style. This feature is unique among the species of

series *Tricolores*. The specific epithet honors prolific Mexican plant collector Francisco Ventura Aburto. He collected most of the specimens upon which this species description is based between 1970 and 1986, and it only took 44 years for the species to be recognized as something new.

LYCIANTHES MICHAELNEEI E. Dean, **sp. nov. TYPE: MEXICO. Veracruz.** Mpio. Calcahualco: 4.2 km W of Escola on road to Jacal, 17.5 km by road NW of Coscomatepec, 19° 10' N, 97° 10'W, bosque de pino-encino, 2200 m, 12 Jan 1981, *M. Nee & G. Schatz 19791* (holotype: WIS; isotype: MEXU). Figure 2.

Most similar to *Lycianthes tricolor* in having notched seeds but differing from that species in geographic distribution, calyx teeth 0.5–1 mm diam. (versus 0.5 mm or less in *L. tricolor*), entirely purple flowers (versus white and purple in *L. tricolor*), largest leaves ca. 13.9–23.5 cm long (versus ca. 4–16 cm long in *L. tricolor*), matted hairs on the stem (unmatted, erect hairs in *L. tricolor*), and very long hairs on the leaves (to 2 mm long versus to 1.2 mm long in *L. tricolor*).

Shrub, 2–4 m high. **Indument** of light yellow erect to appressed, weak, one- to several-celled non-glandular trichomes. **Stems** tan to purplish, darker brown and woody with age, upper branching mostly unichasial with a few dichasial branching points, the longest sympodia 3–6.5 cm long, 1.25–4.5 mm diam., densely pubescent with matted trichomes to 1.2 mm long. **Leaves of upper sympodia** mostly geminate, sometimes unifoliate due to the smaller geminate leaf pair abscising early; largest leaves with petiole 17–35 mm long, lamina ovate, elliptic, or obovate, 13.9–23.5 cm long, 5.5–10.5 cm wide, the tip acuminate, the base rounded to cuneate, sometimes oblique, the margin entire to undulate, the lamina villous with erect to appressed trichomes to 2 mm long, spreading and very dense along the veins; smaller geminate leaves similar but with petiole 2–7 mm long, the lamina ovate to elliptic, 5.7–8.5 cm long, 2.6–4.7 cm wide, the tip acumintate, the base rounded to cuneate. **Flowers** in groups of 1–6(–10) in the leaf axils with one or two flowers per group open at the same time, the pedicels at maturity erect, curved at the tip, 1.5–2.8 cm long, densely pubescent, the trichomes weakly erect, 0.25–0.75(–1.2) mm long; calyx urceolate to campanulate, 2–3 mm long, 2.5–3.5 mm diam., densely pubescent, the trichomes 0.5–1 mm long, the calyx margin entire, the 10 appendages 1–4 mm long, 0.5–1 mm diam.; corolla rotate, 11–16 mm long, purple, most likely greenish purple on abaxial side, puberulent with tiny hairs < 0.2 mm long located on abaxial side near main veins; stamens with straight filaments of unequal length, the four shorter filaments 0.5–1 mm long, the fifth 3.5–4 mm long, glabrous; anthers lanceolate, 3–4 mm long, the pores of the anther of the longest stamen dehiscing toward the style, the pores of the anthers of the shorter stamens dehiscing away from the style; ovary round, glabrous, 1.5 mm long, the style 7–8.5 mm long, slightly curved to straight, the stigma very short, capitate, unlobed. **Fruit** round, 6–9 mm long, 6–8 mm diam., red at maturity, lacking sclerotic granules, the calyx in fruit widening, becoming bowl- to plate-shaped, 1.5–3 mm long, 5.5–9 mm wide, the pedicel in fruit 2.6–4.2 cm long. **Mature seeds** 20–30 in number, brown to orange, flattened, reniform, notched on one side, 2–3 mm long, 2–2.5 mm wide.

Distribution and habitat. Mexico. Veracruz. Elevation: 1750-2600 m. Vegetation types: oak-pine forest, deciduous forest (bosque caducifolio), often in disturbed or secondary forest. Habitats: shady canyons and ravines (barrancas). Phenology: flowering specimens have been collected January–February and June–July; mature fruiting material has been collected June–August and January.

Lycianthes michaelneei is a distinctive addition to series *Tricolores*. It is most commonly misidentified as *L. pilosissima* (M. Mart. & Gal.) Bitter (a synonym of *L. tricolor*), which is the name used for the species in the *Flora of Veracruz*. In using that name in *Flora of Veracruz*, Nee (1986) discussed its provisional nature. *Lycianthes michaelneei* differs from *L. tricolor* in having an entirely purple corolla (lobes and membrane) rather than a white membrane with some purple on the

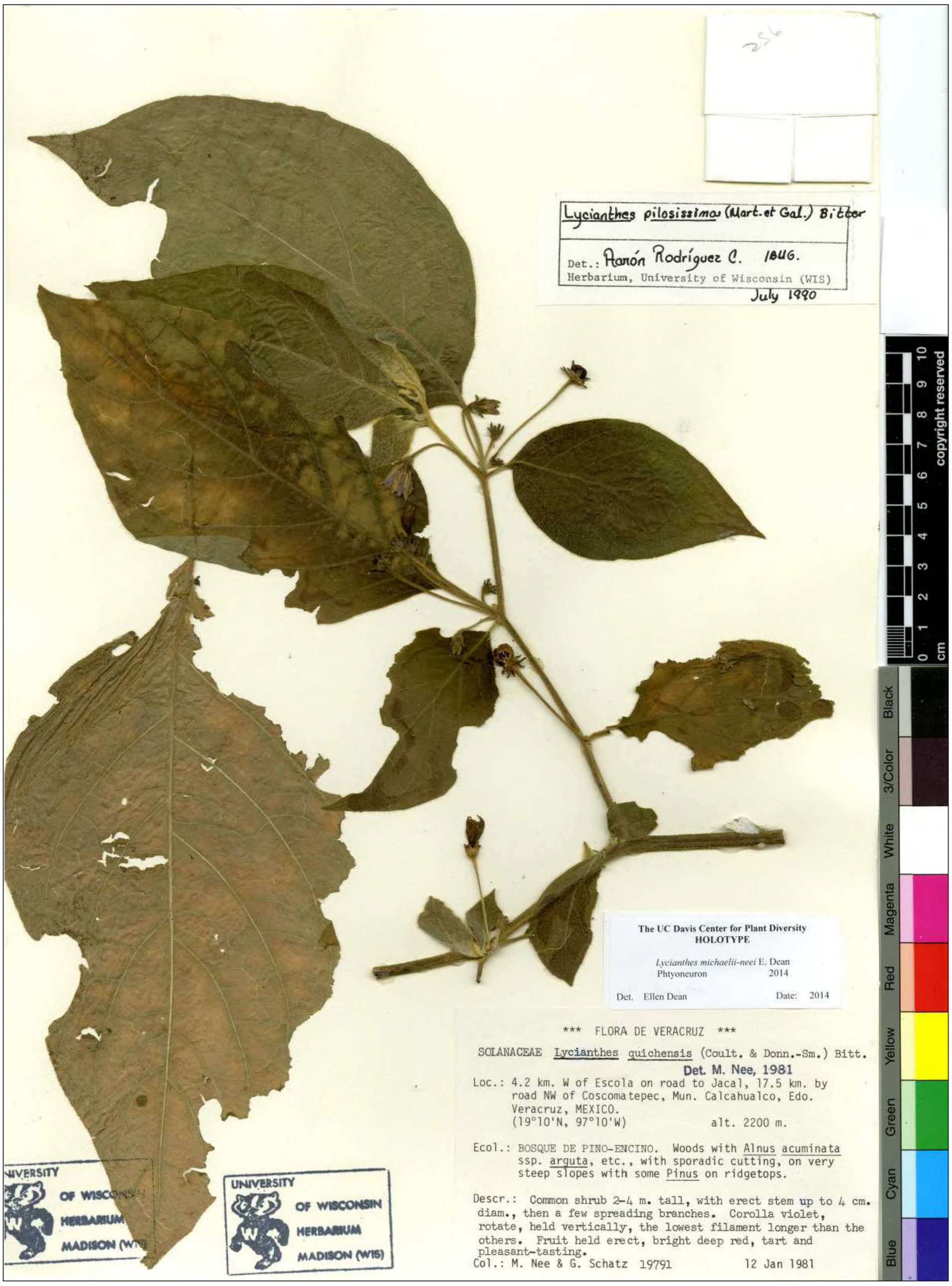
Lycianthes pilosissima (Mart. et Gal.) Bitter
Det.: Aarón Rodríguez C. 1986.
Herbarium, University of Wisconsin (WIS)
July 1990
The UC Davis Center for Plant Diversity
HOLOTYPE
Lycianthes michaelii-neei E. Dean
Phtyoneuron 2014
Det. Ellen Dean Date: 2014
*** FLORA DE VERACRUZ ***
SOLANACEAE Lycianthes quichensis (Coult. & Donn.-Sm.) Bitt.
Det. M. Nee, 1981
Loc.: 4.2 km. W of Escola on road to Jacal, 17.5 km. by road NW of Coscomatepec, Mun. Calcahualco, Edo. Veracruz, MEXICO.
(19°10'N, 97°10'W) alt. 2200 m.
Ecol.: BOSQUE DE PINO-ENCINO. Woods with Alnus acuminata ssp. arguta, etc., with sporadic cutting, on very steep slopes with some Pinus on ridgetops.
Descr.: Common shrub 2-4 m. tall, with erect stem up to 4 cm. diam., then a few spreading branches. Corolla violet, rotate, held vertically, the lowest filament longer than the others. Fruit held erect, bright deep red, tart and pleasant-tasting.
Col.: M. Nee & G. Schatz 19791 12 Jan 1981
UNIVERSITY OF WISCONSIN HERBARIUM MADISON (WIS)
copyright reserved

Figure 2. Holotype of *Lycianthes michaelneei*.

lobes, a color pattern which is found in several species of series *Tricolores*. The label data for the type collection, which are quite detailed, does not mention the presence of green glandular spots on the corolla, and so I am assuming the spots are absent. In general, this species is more robust than other members of series *Tricolores*, with the longest leaves and leaf trichomes of any member of the series. Another distinctive difference is the matted stem hairs which are not found elsewhere in the series.

The specific epithet honors Michael Nee, Solanaceae expert and Curator Emeritus of the New York Botanical Garden who has mentored dozens of would-be Solanaceae taxonomists and annotated thousands of herbarium specimens wherever he has landed. His patience with me has been much appreciated. He collected the type specimen of *L. michaelneei* while employed at the Field Museum of Natural History, Chicago, working in conjunction with INIREB (Instituto Nacional de Investigaciones sobre Recursos Bióticos, now the Instituto de Ecología), Xalapa, on the *Flora de Veracruz* project.

Additional specimens examined. **MEXICO. Veracruz**. Mpio. Calcahualco, Barranca de Atotonilco, 2450 m, 14 Feb 1982, *Cházaro & Oliva 3293* (WIS); Mpio. Ayahualulco, parte alta Cerro Coatepec, a medio camino entre Ayahualulco y Patlanalan, 2600 m, 23 Aug 1985, *Cházaro & Acosta 3701* (WIS); Mpio. Calcahualco, 1 km al S de Escola, 19° 7' N, 97° 8' W, 1950 m, 24 Jul 1986, *Martínez 1227* (NY); Mpio. Calcahualco, San Miguel Tlacotiopa, camino a Nueva Vaquería, Barranca Cuapa, 19° 6' N, 97° 14' W, 2600 m, 30 Jul 1985, *Martínez & Vásquez 525* (MEXU); Mpio. Calcahualco, 500 m al SW de Maquistla, camino a Jacal, 19° 7' N, 97° 11' W, 2200 m, 30 Jul 1985, *Martínez & Vásquez 538* (MEXU); Mpio. Acajete, Plan de Cedeño, 1750 m, 4 Jun 1981, *Ventura 18551* (IEB).

ACKNOWLEDGEMENTS

I thank Jean Shepard for her help with receiving loans at UC Davis, the IEB, MEXU, MO, NY, and WIS herbaria for loans used in this project, MEXU and WIS for granting permission to scan their specimens to use as illustrations, Michael Nee and Guy Nesom for helpful comments, Kanchi Ghandi for advice on the correct form of the specific epithets, and *Phytoneuron* for publication of this paper.

LITERATURE CITED

Bitter, G. 1919. Die Gattung *Lycianthes*. Abh. Nat.Ver. Bremen 24(2): 292–520.

Bohs, L. and R. Olmstead. 1997. Phylogenetic relationships in *Solanum* (Solanaceae) based on *ndhF* sequences. Syst. Bot. 22: 5–17.

Dean, E. 1998. *Lycianthes jalicensis* (Solanaceae), a new species Jalisco, Mexico. Novon 8: 133–136.

Dean, E., G. Walden, and S. Thrasher. 2007. *Lycianthes pringlei* (Solanaceae), a rarely collected shrub of western Mexico. Brittonia 59: 49–53.

Hunziker, A. 2001. The Genera of Solanaceae. A. R. G. Gantner Verlag K.-G., Ruggell, Germany.

Nee, M. 1986. *Lycianthes* in Gómez-Pompa, A. et al. (eds.), Flora of Veracruz 49: 85–110, Instituto Nacional de Investigaciones sobre Recursos Bióticos, Xalapa, Veracruz, Mexico.

Walsh, B. and S. Hoot. 2001. Phylogenetic relationships of *Capsicum* (Solanaceae) using DNA sequences from two noncoding regions: the chloroplast *atpB-rbcL* spacer region and nuclear *waxy* introns. Internatl. J. Pl. Sci. 162: 1409–1418.